CERT

Pipeline

Indicator Expansion with Analysis Pipeline

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1/13/15

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE **13 JAN 2015**	2. REPORT TYPE **N/A**	3. DATES COVERED

4. TITLE AND SUBTITLE
Indicator Expansion with Analysis Pipeline

5a. CONTRACT NUMBER

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)
Ruef /Daniel

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Software Engineering Institute Carnegie Mellon University Pittsburgh, PA 15213

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited.

13. SUPPLEMENTARY NOTES
The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**SAR**	**13**	

This material is based upon work funded and supported by the Department of Defense under Contract No. FA8721-05-C-0003 with Carnegie Mellon University for the operation of the Software Engineering Institute, a federally funded research and development center.

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DM-0002067

Definition

"Indicator expansion is a process of using one or more data sources to obtain more indicators of malicious activity by identifying those related to currently known indicators."

~ Some guy named: Jono Spring 2013

Generic Situation

1. Our host communicates with known bad IP address
2. Host gets infected
3. Host communicates with a different IP for:
   - Command and control
   - Exfiltration

Let’s try and find these second-level IP addresses

- They’re bad

What we need to do

1. Detect our host communication with black list IP
2. Keep a list of these hosts
3. Track the IPs where these hosts send traffic
4. Count how many hosts contact each IP

5. Alert if some number of hosts contact an IP
6. Record those IPs in alerts and/or IPSets

Disclaimer

This algorithm is generic

Threshold values in the example are just examples, they are not to be used

This is not being run anywhere

Illuminates a way Analysis Pipeline can implement existing analysis ideas

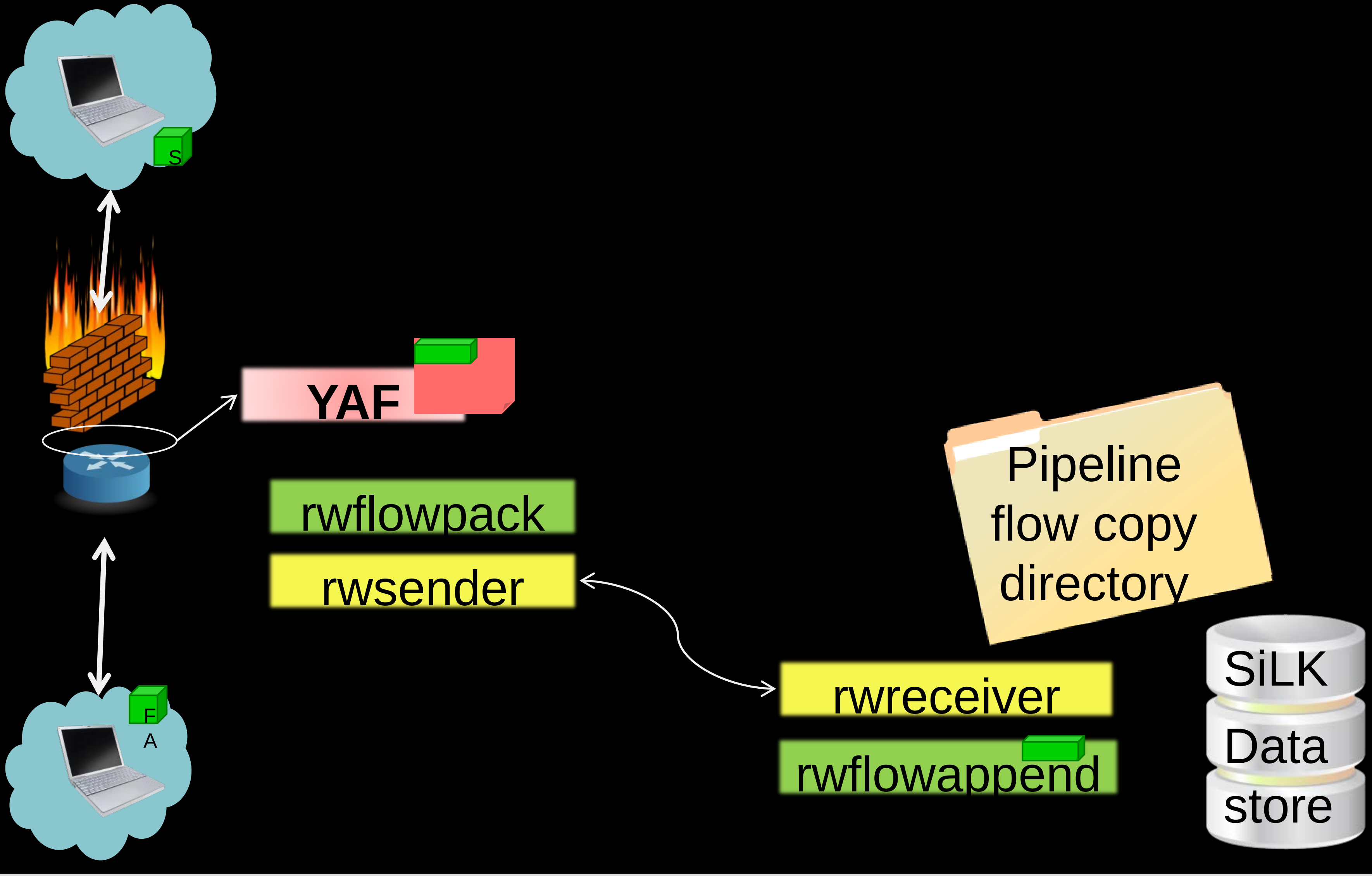
Needs / Decisions

- Need: Accepted malicious IP list
  - SiLK IPSet: badIPs.set will contain these IPs
- Need: White list of IPs where our hosts often communicate with
  - SiLK IPSet: safePopularIPs.set will contain these Ips
- Decision: Track our hosts for 1 day
- Decision: Use 50 hosts contacting second level IP as the threshold, within a 36 hour time window
- Decision: Dump list of second level IPs in both an alert and IPSet file every 6 hours

Analysis Pipeline overview

- Version 4.4.1 publicly released:
  - tools.netsa.cert.org/analysis-pipeline
- Streaming analysis of SiLK records
- Filters
- Internal Filters – “scratch paper”
- Evaluations / Statistics
  - Can bin state based on value of specified field
- Configuration file tells Pipeline what to do
  - Simple config files accomplishes our entire scenerio

Mechanics of Flow Collection



YAF

rwflowpack

rwsender

Pipeline flow copy directory

rwreceiver

rwflowappend

SiLK Data store

Steps 1 & 2 – Detect and Track

```
FILTER badTraffic
        DIP IN LIST “badIPs.set”
END FILTER
INTERNAL FILTER trackInfectedHosts
        FILTER badTraffic
        SIP infectedHosts 1 DAY
END INTERNAL FILTER
```

Step 3 watch where infected hosts go

```
FILTER nonWhiteListPostInfected
        SIP IN LIST infectedHosts
        DIP NOT IN LIST safePopularIPs.set
END FILTER
```

Step 4 & 5: Count Hosts Per IP and Alert

```
EVALUATION secondLevelPopularIPs
        FILTER nonWhiteListPostInfected
        FOREACH DIP
        OUTPUT TIMEOUT 1 DAY
        OUTPUT LIST DIP secondLevelIPs
        <alerting options…not discussed>
        CHECK THRESHOLD
                DISTINCT SIP > 50
                TIME WINDOW 36 HOURS
        END CHECK
END EVALUATION
```

Step 6: Report Expanded Indicators

```
LIST CONFIGURATION secondLevelIPs
        UPDATE 6 HOURS
        SEED “latestSecondLevelIPs.set”
        OVERWRITE ON UPDATE
END LIST CONFIGURATION
```

Full Configuration – not so hard

```
FILTER badTraffic
        DIP IN LIST “badIPs.set”
END FILTER
INTERNAL FILTER trackInfectedHosts
        FILTER badTraffic
        SIP infectedHosts 1 DAY
END INTERNAL FILTER
FILTER nonWhiteListPostInfected
        SIP IN LIST infectedHosts
        DIP NOT IN LIST safePopularIPs.set
END FILTER
```

```
EVALUATION secondLevelPopularIPs
        FILTER nonWhiteListPostInfected
        FOREACH DIP
        OUTPUT TIMEOUT 1 DAY
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        <alerting options…not discussed>
        CHECK THRESHOLD
            DISTINCT SIP > 50
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        END CHECK
END EVALUATION
LIST CONFIGURATION secondLevelIPs
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END LIST CONFIGURATION
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Questions/comments?

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